

AMENDMENTS TO THE CLAIMS

1. (CURRENTLY AMENDED) A representation of a macro for an integrated circuit layout comprising:, ~~the representation defining~~

a plurality of diffusion regions;

5 a metal layer connected to said diffusion regions; and

at least one interconnection layer above said metal layer, wherein (i) said diffusion regions and said metal layer form a plurality of sub-circuit cells of a first module, (ii) said at least one interconnection layer connects at least two of said
10 sub-circuit cells in accordance with said macro to complete said first module having a predefined functionality, wherein and (iii) said sub-circuit cells include at least one reusable circuit cell configured with a plurality of signal terminals such that when said predefined functionality of said module is not used in a custom
15 design, said reusable circuit cell is connected to at least one second module through said terminals by said at least one interconnection layer in said custom design ~~available for re-use.~~

2. (CURRENTLY AMENDED) The representation of claim 1, wherein said signal terminals of said reusable circuit cell ~~has~~ comprise an input terminal and an output terminal accessible by a

~~user definable~~ said at least one interconnection layer of said
5 integrated circuit layout.

3. (ORIGINAL) The representation of claim 1, wherein
said reusable circuit cell comprises a buffer.

4. (ORIGINAL) The representation of claim 1, wherein
said reusable circuit cell comprises an inverter.

5. (CURRENTLY AMENDED) A computer based design tool for
generating a design representation of a macro for inclusion in an
integrated circuit layout, the macro having a predefined
functionality and comprising (i) a plurality of diffusion regions
5 and (ii) a metal layer connected to said diffusion regions to form
a plurality of sub-circuit cells and (iii) at least one
interconnection layer above said metal layer to connect at least
two of said sub-circuit cells to form a first module in accordance
with said macro, wherein the tool is configured to:

10 generate said design representation of said macro such
that at least one of said sub-circuit cells is a reusable
sub-circuit cell having a plurality of signal terminals that are
(i) connectable to at least one second module through said at least
one interconnection layer in a custom design ~~is reusable~~ when said
15 predefined functionality of said first module is not used in said

custom design and (ii) connected internal to said first module when said predefined functionality is used in said custom design.

6. (CURRENTLY AMENDED) The computer based design tool of claim 5, wherein said tool is further configured to generate for said reusable sub-circuit cell, a representation of an input terminal and a representation of an output terminal for connecting
5 said reusable sub-circuit cell to said at least one interconnection according to one of (i) said macro and (ii) said custom design ~~a user defined layer of said integrated circuit layout.~~

7. (ORIGINAL) The computer based design tool of claim 5, wherein said reusable sub-circuit cell comprises a buffer.

8. (ORIGINAL) The computer based design tool of claim 5, wherein said reusable sub-circuit cell comprises an inverter.

9. (CURRENTLY AMENDED) The computer based design tool of claim 5, wherein said design tool is configured to generate a plurality of said design representations of said macro (i) each capable of performing said predefined functionality and (ii) in
5 which different numbers of said sub-circuit cells are said reusable sub-circuit cells.

10. (CURRENTLY AMENDED) The computer based design tool of claim 5, wherein said design tool is configured to generate a second design representation of said macro in which none of said sub-circuit cells are said reusable sub-circuit cells.

11. (ORIGINAL) The computer based design tool of claim 5, wherein said design tool is further configured to generate a parameter defining a reuse permission for said reusable sub-circuit cell.

12. (ORIGINAL) The computer based design tool of claim 11, wherein said reuse permission comprises a permission to use said reusable sub-circuit cell as a repeater cell for routing.

13. (ORIGINAL) The computer based design tool of claim 11, wherein said reuse permission comprises a permission to reuse said reusable sub-circuit cell as a fully reusable cell.

14. (CURRENTLY AMENDED) A computer based design tool for automatically designing a physical routing of conductive paths across a predesigned integrated circuit slice, wherein the tool is configured to route one of more of said conductive paths over an area of ~~unused circuit cells defining~~ a circuit module having a

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predefined functionality, the routing comprising the steps of:
~~whose functionality is not used, by.~~

(a) identifying ~~an unused~~ a reusable circuit cell of
said circuit module that is (i) usable within said circuit module
10 as part of said predefined functionality and (ii) reusable as a
first repeater cell;

(b) placing a first connection path extending over a
first portion of said area from outside said area to an input a
terminal of said first repeater cell, ~~and~~ when said predefined
15 functionality is unused in a custom design on said predesigned
integrated circuit slice; and

(c) placing a second connection path according to a
macro defining said circuit module, said second connection path
extending over a second portion of said area from ~~an output~~ inside
20 said area to said terminal when said predefined functionality is
used in said custom design on said predesigned integrated circuit
slice of said first repeater cell.

15. (CURRENTLY AMENDED) The computer-based design tool
of claim 14, wherein said tool is configured to place said first
connection path and said second connection path in one or more user
specified interconnection layers of said integrated circuit slice
5 defined by (i) said macro before said custom design is created and
(ii) said custom design is said predefined functionality is unused.

16. (ORIGINAL) The computer based design tool of claim 14, wherein said first repeater cell comprises a buffer circuit cell.

17. (ORIGINAL) The computer based design tool of claim 14, wherein said first repeater cell comprises an inverter circuit cell.

18. (CURRENTLY AMENDED) The computer based design tool of claim 14, ~~wherein said tool is further configured to~~ further comprising the steps of:

5 ~~(d) identify~~ identifying a second ~~unused~~ circuit cell of said circuit module that is reusable as a second repeater cell in combination with said first repeater cell when said predefined functionality is unused in said custom design;

10 ~~(e) place~~ placing said second connection path to extend from ~~said~~ an output terminal of said first repeater cell to an input terminal of said second repeater cell; and

~~(f) place~~ placing a third connection path extending over a third portion of said area from an output terminal of said second repeater cell to external said area.

19. (ORIGINAL) The computer based design tool of claim 18, wherein said first and second repeater cells are of the same circuit type.

20. (ORIGINAL) The computer based design tool of claim 19, wherein said first and second repeater cells are inverter circuit cells.

21. (CURRENTLY AMENDED) A method for designing a macro for ~~inclusion~~ a first module included in an integrated circuit, the method comprising the steps of:

(A) generating a design representation of said macro to

5 (i) provide a predefined functionality in said first module, and
(ii) comprise a plurality of diffusion regions and a metal layer connected to said diffusion regions to form a plurality of sub-circuit cells and (iii) further comprise at least one interconnection layer configured to connect at least two of said
10 sub-circuit cells to form said first module when a custom design uses said predefined functionality; and

(B) configuring at least one of said sub-circuit cells as one of (i) part of said predefined functionality when said predefined functionality is used in said custom design and (ii) a
15 reusable sub-circuit cell connected external to said first module

when said predefined functionality is not used in said custom design.

22. (CURRENTLY AMENDED) The method of claim 21, wherein the step of generating said design representation comprises the sub-step of:

5 generating a plurality of design representations of said macro (i) each capable of performing said predetermined functionality when said reusable sub-circuit cells are connected internal said first module and (ii) in which different numbers of said sub-circuit cells are reusable sub-circuit cells.

23. (CURRENTLY AMENDED) The method of claim 21, wherein further comprising generating a second design representation of said macro in which none of said sub-circuit cells are said reusable sub-circuit cells.

24. (ORIGINAL) The method of claim 21, further comprising a step of generating a parameter defining a reuse permission for said reusable sub-circuit cell.